Joshua Lederberg

In February 1975, 150 experts from around the world met at the International Conference on Recombinant DNA Molecules to discuss openly the wisdom of pursuing genetic engineering research. Lederberg attended that meeting and has been an active participant in the continuing debate on this controversial subject. In a recent paper (17)

he expressed his view of the matter. He begins by explaining that we now have the technical capability to fragment animal or human DNA into perhaps a million segments and transfer a single segment to a bacterial host for study or for production of large quantities of a specific DNA segment. This technique of gene implantation can also be used to transfer the genetic information from the cell of one species to that of another. Although applications for the "DNA splicing" procedure have not yet been fully developed, such research "promises some of the most pervasive benefits for the public health since the discovery and promulgation of antibiotics." For example, the technique could be used for large-scale production of human proteins, such as the antibody globulins that are currently in scarce supply for medical use. The biosynthetic proteins would make it possible to provide many people passive immunization against such infectious diseases as influenza, hepatitis, herpes and rabies.

Lederberg emphasizes another important reason for continuing DNA splicing research: to learn as much as possible about how to defend against "viral pandemic." A new, virulent strain of influenza, for example, could be terribly destructive if scientists did not have enough tools to quickly develop a vaccine, or some other medical defense.

The potential benefits are great; there are also risks. Many scientists are concerned that DNA splicing may inadvertently generate a new pathogen inimicable to man. Since the procedure is relatively simple, there is concern that people with "less-than-mature" professional and ethical judgment may try to use it. Lederberg emphasizes the importance of making every effort to assess both the risks and the benefits of DNA splicing research to find the optimal balance in its control.

A committee of the National Academy of Sciences has recommended that where hazard in the research is reasonably predictable, laboratory containment procedures akin to those appropriate for known pathogens should be used. Lederberg agrees with this. He disagrees, however, with proposals that would place extreme security requirements on research involving implausible hazards, such as the introduction of existing genes for antibiotic resistance into other nonpathogenic species. Instead, he believes that the best strategy would be to use safe "vectors," such as bacteria with little chance of survival outside the laboratory.